



2017

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Recommended Citation

McGrath, Diana J.; Terhune, Theron M. II; and Martin, James A. (2017) "Using First Passage Time Analysis to Identify Foraging Patterns of the Northern Bobwhite," *National Quail Symposium Proceedings*: Vol. 8 , Article 81.
Available at: <http://trace.tennessee.edu/nqsp/vol8/iss1/81>

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USING FIRST PASSAGE TIME ANALYSIS TO IDENTIFY FORAGING PATTERNS OF THE NORTHERN BOBWHITE

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ABSTRACT

Patterns in movement data can reveal important information relating environmental variables to behavioral mechanisms. First passage time analysis (hereafter; FPT) can be used to quantify the spatial and temporal variation in movements by identifying areas of restricted search behavior based on measuring residence time in an area. It is applicable in studies of foraging ecology and habitat selection because it can empirically quantify behavioral decisions without any *a priori* assumptions of habitat availability. Furthermore, FPT analysis is simple to implement and interpret; however, the technique has yet to be applied to the northern bobwhite (*Colinus virginianus*, hereafter bobwhite) because telemetry locations in short (e.g., 30 min) successive time intervals are needed. Our primary objective was to better understand patterns in foraging behavior of bobwhites as it relates to habitat use and improve management. Our secondary objective was to test the efficiency of using FPT analysis on telemetry data collected at different time intervals. Bobwhites were captured during the fall of 2013 and 2014 on a private plantation in South Carolina and fitted with very high frequency (VHF) transmitters ($n = 143$ and $n = 148$, respectively). We located coveys at 1 hour (2013) and 30 (2014) minute time intervals during daylight. Bobwhites concentrated their searching efforts to a few hours pre-dusk. Search efforts were proximal to supplemental food sources, with some intra-seasonal variation. Advances in global positioning system (GPS) technology will likely increase opportunities for collecting fine-scale movement data for bobwhites. Understanding techniques such as FPT analysis will enhance our knowledge of northern bobwhite ecology and management.

Citation: McGrath, D. J., T. M. Terhune II, and J. A. Martin. 2017. Using first passage time analysis to identify foraging patterns of the northern bobwhite. National Quail Symposium Proceedings 8:308.

Key words: behavior, *Colinus virginianus*, first passage time, foraging, habitat use, northern bobwhite

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